



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

CW

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,731	08/28/2001	Norihiko Araki	KPM-01801	5139

26339 7590 08/22/2003

PATENT GROUP
CHOATE, HALL & STEWART
EXCHANGE PLACE, 53 STATE STREET
BOSTON, MA 02109

EXAMINER

SCHEUERMANN, DAVID W

ART UNIT	PAPER NUMBER
----------	--------------

2834

DATE MAILED: 08/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/940,731	ARAKI, NORIHIKO
Examiner	Art Unit	
	David W. Scheuermann	2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 13 June 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-16 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 13 June 2003 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The replacement figures 4 and 6, filed on June 13, 2003 are acceptable.

The rejection under 35 U.S.C. §112, second paragraph, has been withdrawn in view of applicants' remarks that the power supply supplies starting and drive current.

Applicant's arguments with respect to claims 1-3 and 9-11 have been considered but are moot in view of the new ground(s) of rejection. Furthermore, since both Takekawa and Cassat et al. disclose starting in synchronous mode (i.e., selective applying waveforms to the stator coils in a sequence to simulate a rotating magnetic field which in turn induces the rotor to turn) it is inherent that a waveform is selected from the sequence. In a similar fashion, a waveform consisting of one or more phases A-E in device of Makaran is inherently selected, to begin the process of simulating a rotating magnetic field to cause the motor rotor to rotate.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 and 9 -11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takekawa, US 5783917 in view of Kogler et al., US 4246518. Takekawa discloses

the invention of a brushless DC motor 10; supplying starting current to the motor, see 71 in figure 9; measuring an induced voltage, see block 74; and supplying a drive current for the armature coil in response to the said induced voltage, see block 75. Since the motor is started in synchronous mode (column 7, lines 24) it is inherent that a waveform is selected from states 1- 6 as shown in figure 3 and described in column 6, lines 21-43. Note that "drive device" 20 is considered a power supply unit since it supplies starting and drive current to the motor. Takekawa does not expressly disclose selecting a first starting waveform from a plurality of stored waveforms. Kogler et al. disclose storing the commutation signals to be supplied to the motor in a memory, for the purpose of enabling the motor to be used as a stepping motor as noted in column 1, lines 26-44. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to store the commutation signals (i.e., states 1- 6) of Takekawa in a memory. One of ordinary skill in the art would have been motivated to do this to enable the motor to operate as a stepper motor and to facilitate changes in operating characteristics via software rather than hardware.

Re claims 2 and 10, note position detection circuit 50. As to claims 3 and 11, note in column 7, lines 15-39, that the measuring is executed after the supplying of the starting current.

Claims 1-2, 4, 9-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cassat et al., US 5245256 in view of Kogler et al. Cassat et al. disclose the invention of a brushless DC motor 100; supplying starting current to the motor, column 3, lines 57-66; measuring an induced voltage, column 3, lines 57-66; and

supplying a drive current for the armature coil in response to the said induced voltage, see column 11, lines 15-17. Cassat describes that the motor is started in synchronous mode as set forth in column 7, lines 61-66 and column 1, lines 28-34. Furthermore, it is inherent that a waveform is selected in the device of Cassat when it is started in synchronous mode. Note that driver 107 is considered a power supply unit since it supplies starting and drive current to the motor. Cassat et al. do not expressly disclose selecting a first starting waveform from a plurality of stored waveforms. Kogler et al. disclose storing the commutation signals to be supplied to the motor in a memory for the purpose of enabling the motor to be used as a stepping motor as noted in column 1, lines 26-44. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to store the commutation signals of Cassat et al. in a memory. One of ordinary skill in the art would have been motivated to do this to enable the motor to operate as a stepper motor and to facilitate changes in operating characteristics via software rather than hardware.

Re claims 2 and 10, note column 3, line 65. As to claims 4 and 12, note in column 3, lines 59-63, the back EMF is measured on the phase not energized.

Claims 1, 5-7, 9, 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makaran, US 5744921 in view of Kogler et al. Makaran discloses the invention of a brushless DC motor 102; having power supply 104, figure 1; supplying starting current to the motor; measuring an induced voltage, as described in the abstract; and supplying a drive current, see figure 5. One or more phases A-E (forming a waveform) in device of Makaran is inherently selected, to begin the process of

simulating a rotating magnetic field to cause the motor rotor to rotate. Note motor power supply 104 that supplies starting and drive current to the motor. Makaran does not expressly disclose selecting a first starting waveform from a plurality of stored waveforms. Kogler et al. disclose storing the commutation signals to be supplied to the motor in a memory for the purpose of enabling the motor to be used as a stepping motor as noted in column 1, lines 26-44. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to store the commutation signals of Makaran in a memory. One of ordinary skill in the art would have been motivated to do this to enable the motor to operate as a stepper motor and to facilitate changes in operating characteristics via software rather than hardware.

Re claims 5 and 13, note the logic flowchart depicted in figure 4 and figure 5. If there is no movement, 322, after the application of a first starting current, 318, a second starting current, 336, is supplied.

As to claims 6 and 14, note the abstract teaches stopping the rotor before reverse windings 114 are energized.

Claims 7 and 15 call for the motor to accelerate to a predetermined speed. Makaran teaches inputting set-point speed signal 146 into the motor controller, as shown in figure 1 to achieve such an effect. Note in column 10, lines 24-34 that in the system of Makaran supplies a varied duty cycle to provide closed-loop control. Since measured speed is compared to set speed, it is inherent that measured speed is used to control the drive current. Furthermore, because the measured speed signal is based on rotor position and rotor position in turn is determined based on induced voltage it is

inherent that the control of drive current is based on any of measured speed, rotor position and induced voltage. Therefore, in the closed-loop control system of Makaran drive current is based on measured speed and rotor position and induced voltage.

Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Makaran and Kogler et al. The combination of Makaran and Kogler et al. disclose the invention substantially as claimed as set forth in the rejection of claim 1 above. The combination of Makaran and Kogler et al. do not expressly disclose accelerating the motor the predetermined speed at maximum torque. However the combination of Makaran and Kogler et al. provide that the PWM signal may be varied up to 100%, see Makaran column 6, lines 40-43, permitting the motor to operate at maximum torque. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to set the PWM signal to 100%. One of ordinary skill in the art would have been motivated to do this cause the rotor to accelerate to the predetermined speed in the shortest time. Since measured speed is compared to set speed, it is inherent that measured speed is used to control the drive current.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Peters et al. teach having predetermined commutation states stored in memory, note table 1. Kimura teaches memory storage of starting waveforms having specific voltage/frequency characteristics as noted in columns 17 and 18, lines 46-54 and 46-59, respectively. Claim 11 of Hollenbeck et al. recite a microprocessor and memory for controlling motor current.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David W. Scheuermann whose telephone number is (703) 308-9637. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

dws
August 18, 2003



BURTON S. MULLINS
PRIMARY EXAMINER